

6. REDESCRIPTION OF BATHYAL FISH *GLYPTOPHIDIUM MACROPUS* ALCOCK, 1894 FROM INDIAN EEZ (OPHIDIIFORMES: OPHIDIIDAE)

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The first authentic record of deep sea fishes from India was made by Alcock (1891) with the help of fishes collected by *R.L.M.S Investigator* in his book INDIAN DEEP SEA FISHES IN THE INDIAN MUSEUM. Investigation on the deep sea fishes of Indian Exclusive Economic Zone (EEZ) were mainly carried out by the Fisheries Survey of India, concentrating mostly in the continental shelf region. Hence, information regarding the Indian deep sea fish fauna is scarce and the only available data is from the fishing cruises of the Indian research ship *FORV Sagar Sampada*, as a part of its Stock Assessment Programme of deep sea fin and shell fishes. Recent research cruises of *FORV Sagar Sampada* have unearthed many little known deep sea fishes of Order Ophidiiformes unravelling the rich deep sea ichthyofaunal biodiversity of India.

Ophidiids are predominant members of deep sea demersal fishes from the continental slope to abyssal plain (Haedrich and Merrett 1988; Merrett and Haedrich 1997). The first catalogue of Ophidiiformes was published by Cohen and Nielsen (1978), which mainly focused on genus level while species classification is incomplete. Subsequently, Nielsen and Cohen (1999) published another catalogue that included all Ophidiiformes of the world, which included 48 genera and 218 species of deep sea fishes under Family Ophidiidae. Genus *Glyptophidium* has been revised by Nielsen and Machida (1988), which includes seven recognized species. The species fall into two well-defined species group: *argentium* species, which includes *G. argentium* Alcock, 1889, *G. effulgens* Nielsen & Machida, 1988 and *G. lucidum* Smith & Radcliffe, 1913 and *macropus* species, which includes the remaining four species, namely *G. macropus* Alcock, 1894, *G. longiceps* Norman, 1939, *G. oceanium* Smith & Radcliffe, 1913, and *G. japonium* Kamohara, 1936.

Glyptophidium collections landed by *FORV Sagar Sampada* were subjected to detailed taxonomic studies, which confirmed the identity of *G. macropus* Alcock, 1894. This species has not received much attention since its original description by Alcock (1894) from its type locality, Bay of Bengal. Hence, an attempt is also made to redescribe this deep sea fish by comparing its morphometrics and meristics

with its lectotype and paralectotypes.

The present study was carried out as part of the Ministry of Earth Sciences (MoES), Government of India, funded research project on "Resource assessment and biology of deep sea fishes along the continental slope of Indian EEZ". The fishes were caught during cruise no: 250 of *FORV Sagar Sampada*, from station number 12 (12° 28' 2" N; 74° 09' 5" E) at a depth of 415 m on 8.xi.2006 (Fig. 1) using HSDT fish version (High Speed Demersal Trawl) net and identified following Nielsen and Machida (1988). Specimens were deposited in the Fish Museum of School of Industrial Fisheries (SIF), Cochin University of Science and Technology, India. Morphometric measurements were taken to the nearest millimetre using a dial Vernier Caliper following Smith and Heemstra (1986). Body proportions were expressed in terms of standard length (SL: length from snout tip to the base of caudal fin) and head length (HL: length of snout tip to the

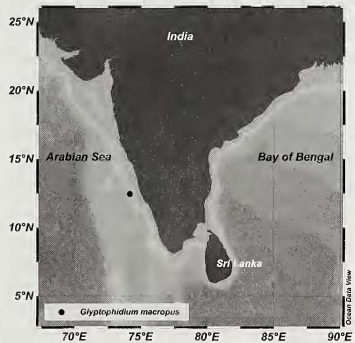


Fig. 1: Locality map of *Glyptophidium macropus* from the EEZ of India

posterior margin of opercle). Meristic counts were made following Nielsen and Machida (1988). Meristic counts and proportional measurements of *Glyptophidium macropus* with its lectotype and paralectotypes are given in Table 1. Measurements of the types were archived from Nielsen and Machida (1988).

Systematics

Order: Ophidiiformes Cohen & Nielsen, 1978

Suborder: Ophidioidei Cohen & Nielsen, 1978

Family: Ophidiidae Rafinesque, 1810

Subfamily: Neobythitinae Radcliffe, 1913

Genus: *Glyptophidium* Alcock, 1894

Glyptophidium macropus Alcock, 1894

Type material: *Glyptophidium macropus* Alcock, 1894:122, pl. VI, fig.3 (type locality: Bay of Bengal)

G. macropus: Alcock, 1895: pl. XV, fig.6 and 1899:94; Brauer, 1906: 303 (now referred to *longipes*); Zander, 1906: 166 (now referred to *longipes*); Norman, 1939: 77; Menon and Yazdani, 1968: 148; Cohen and Nielsen, 1978: 32;

Lectotype: ZSI 13534 (SL 128 mm, female, "Investigator" st.162 (13° 51' 12" N; 80° 28' 12" E) 265-458 m, trawl, 30.i.1984.

Paralectotypes: ZSI 13529-13533, 13535 (SL 81-125+ mm, 3 females + 3 males), same data as for lectotypes.

Material Examined: SIF250/GM1 (Fig. 2), 133.9 mm SL, off Mangalore, SW coast of India, 12° 28' 2" N and 74° 09' 5" E, HSDT net, 415 m, 8.xi.2006.

Diagnosis: *G. macropus* differs from other species in the *macropus* species group by the following combinations of characters: developed gill rakers 36-41, basibranchial with two median and a pair of tooth patches and 2 rays in each ventral fin.

Description: Origin of dorsal fin close to head; in front of the anterior vertebrae, dorsal fin rays 2-3 times as long as corresponding anal fin rays; pectoral fins placed below midline of body; 2 rays in each ventral fin; caudal fin small with 9 rays. Cycloid scale, deciduous, head scale less. Lateral line indistinct. Mouth large with maxillary reaching posterior margin of orbit, numerous granular rows of teeth in irregular rows in dentary, premaxillary, vomer and palatine. Vomerine teeth somewhat longer than those on other bones,

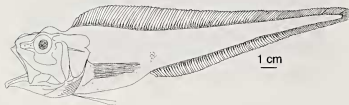


Fig. 2: Lateral view of *Glyptophidium macropus*

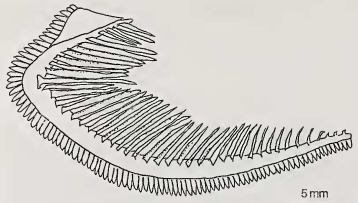


Fig. 3: Gill rakers of *Glyptophidium macropus*

dentigerous part V-formed. Distinct nostril placed midway between upper lip and orbit; posterior nostril larger. Basibranchial with two median and a pair of tooth patches, the latter overlapping or free of anterior median patch (Fig. 4). Anterior gill arch with many long rakers, the longest of which are 2-3 times length of gill filaments (Fig. 3). Pseudobranchial filaments 7-8.

Relationship: The closest related species is *G. longipes* with which it shares the following characters: long ventral fin rays (100-200% of length of head) and few pseudobranchial



Fig. 4: Basibranchial tooth patch of *Glyptophidium macropus*

Table 1: Meristic counts and proportional measurements of *Glyptothidium macropus* with its lectotype and paralectotypes

Locality Depth (m)	Lectotype ZSI 13534 Bay of Bengal 265-458	Paralectotype (6 specimen) Bay of Bengal 265-458	SIF250/GM1 Off Mangalore 415	Locality Depth (m)	Lectotype ZSI 13534 Bay of Bengal 265-458	Paralectotype (6 specimen) Bay of Bengal 265-458	SIF250/GM1 Off Mangalore 415
	TL (mm)	-	-		144	Eye length	28.0
SL (mm)	128	81-125+	133.9	Depth at eye	-	-	25.5
In % of SL				Upper jaw length	-	-	46.1
Body depth	-	-	27.1	Depth at	-	-	15.3
Head depth	-	-	20.1	maxillary end			
Head length (HL)	25	24-25.5	27.6	Depth at dorsal fin	72.0	80.0	73.1
Depth at dorsal fin	19.5	20.5	22.5	Depth at anal fin	55.0	53	55.0
Depth at anal fin	13.5	13.5	15.7	In % of preanal length			
Preanal length	38.5	34.5-39.5	44.3	Head length	65	61-70	64.7
Predorsal length	19.0	20	18.7	Counts			
Prepectoral length	-	-	30.0	Dorsal fin rays	119	118-119	116
Prepelvic length	-	-	24.3	Anal fin rays	90	91-98	88
Dorsal fin base	-	-	80.6	Caudal fin rays	9	9	9
Anal fin base	-	-	48.9	Pectoral fin rays	24	24	24
Pectoral fin length	-	-	20.2	Pelvic fin rays	2	2	2
Pelvic fin length	-	-	18.6	Branchiostegal	-	-	10
Eye length	7.0	5.9-6.4	8.2	rays			
Post orbital length	13.5	13.0	13.0	Pseudobranchial	9	7-8	8
				filament			
In % of HL				Gill rakers	38	37-41	42
Preorbital length	-	-	29.0	Developed gill	37	36-41	41
Postorbital length	-	-	42.9	rakers			
Inter orbital width	-	-	25.4	Anterior anal	31	29-32	32
Diameter of	-	-	14.0	ray below dorsal			
horizontal orbit				ray number			

Source: Nielsen and Machida (1988)

filaments (8). It differs from *G. longipes* by having more pectoral fin rays (24 vs. 20-23), more caudal fin rays (9 vs. 7-8), larger orbit (14 vs. 4.6- 5.6% SL) and pseudobranchial filament with light stem (vs. dark stem).

Distribution: *G. macropus* is reported from northern Indian Ocean from the Gulf of Aden to off Sumatra and off Lombok. All specimens were taken in bottom trawls between 40 and 549 m depth.

Remarks: Most of the morphometric measurements in terms of % TL and SL of the SIF 250/GM1 was compared with that of the lectotype and paralectotypes. Depth at dorsal fin and anal fin, preanal length, predorsal length, post orbital length in % SL were found to be in the close range (Table 1). These measurements were also agreeing with the materials studied by Nielsen and Machida (1988). Few measurements such as post orbital length in % SL and depth at anal fin in % HL were almost the same (13-13.5 and 55 respectively) when compared with the lectotype and paralectotypes. Besides, counts of caudal fin, pectoral fin and pelvic fin support with the types and also concur with

Nielsen and Machida (1988) materials. The morphometrics and meristics clearly confirm that SIF 250/GM1 is *G. macropus*. The species has been recorded first by Alcock in 1894 from Bay of Bengal. Since then it has not received much attention until 1988 when Nielsen and Machida made a revision of bathyal fishes under the genus *Glyptothidium*. The present redescription of this fish may also strengthen the rich deep sea ichthyofaunal biodiversity of the EEZ of India, and confirms the occurrence of the species in both the coast of India.

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7. AN ADDITIONAL RECORD OF LARVAL HOST PLANT OF TAWNY COSTER *ACRAEA VIOLAE* (FABRICIUS 1775)

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Tawny Coster *Acraea violae* is a common nymphalid found in forest clearings, open country and gardens (Kunte 2000; Kehimkar 2008). During a faunal survey at Mazgaon, (18° 21' 58.66" N; 72° 55' 58.73" E; 14 m above msl) Taluka Murud-Janjira, District Raigad, Maharashtra, on January 13, 2010, we observed larvae of different instars of Tawny Coster feeding on a small shrub *Turnera ulmifolia* L., which is commonly known as 'Yellow Alder', belonging to Family Turneraceae. *Turnera ulmifolia* L. is a common cultivated plant about 1 m in height, stem erect, branches glandular pubescent. It occasionally occurs in scrub forests of Konkan (Ingalthalikar 2001).

The perusal of literature elucidate that the *Turnera ulmifolia* is an unreported host plant for Tawny Coster (Table 1). Family Turneraceae is an additional host plant family taking the total to ten for Tawny Coster.

The larva only feeds on leaves and starts eating it in an arc length from the margins up to the mid-rib. *Turnera ulmifolia* is known for cyanogenesis (ability of plants to liberate hydrogen cyanide (HCN) when damaged). Schappert and Shore (1999) on Jamaica have studied the relationship of *Turnera ulmifolia* and *Euptoieta hegesia* in the context of cyanogenesis, herbivory and plant defence. Further research is needed to determine the effect of herbivory of Tawny Coster on *Turnera ulmifolia*. This observation is also particularly important as *Turnera ulmifolia* is an invasive alien species in India. It is interesting to know whether it is possible to use Tawny Coster to control invasion of *Turnera ulmifolia* in future.

Though we report *Turnera ulmifolia* as a host plant for the Tawny Coster *Acraea violae* in India, Robinson *et al.* (2010) reported two more nymphalid butterfly species feeding on *Turnera ulmifolia* in other parts of the world (Table 2).